

Kennecott
10 East South Temple
PO Box 11248
Salt Lake City, Utah 84147
(801) 322-8261

Robert A. Malone
Director, Environmental Affairs

RECEIVED
SEP 08 1986

December 2, 1985

DIVISION OF
OIL, GAS & MINING

Kennecott

Mr. Calvin Sudweeks
Director, Bureau of Water
Pollution Control
Utah Division of Environmental Health
P. O. Box 45500
Salt Lake City, Utah 84145

Dear Mr. Sudweeks:

SUBJECT: Utah Copper Division Modernization Project

Enclosed for your review is revised information about the Utah Copper Division Modernization Project. This revised information reflects the scope of the recently approved project. A project scope summary is attached. The designations on the enclosed information correspond to the designations on the information included in our previously submitted "Project Overview and Water Management Report, Revision 1." These new exhibits replace some of the previously submitted exhibits included in the cited report. Included in this package is:

- o Summarized Scope Changes to Modernized Facility
- o Scope Summary
- o Modernized UCD Flow Diagram
- o Exhibit A - Drainage Report Area Plan
- o Exhibit B - Concentrator Site Drainage Plan
- o Exhibit G - Septic Tank and Absorption Field
- o Exhibit H - Flotation Feed System Pipeline Profile
- o Exhibit I - Flotation Feed System Drainage Area Plan
- o Exhibit K - Pipeline Corridor - Typical Drainage Details
- o Exhibit P - Zone III Retention Pond
- o Exhibit S - Retention Pond Dams - Typical Sections & Details
- o Exhibit T - 7.5 Million Gallon Process Water Reservoir

0035

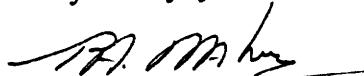
Mr. Calvin Sudweeks
December 2, 1985
Page Two

- o Exhibit U - 7.5 Million Gallon Process Water Reservoir Sections and Details
- o Exhibit V - Flotation Feed Pipeline System - Drop Box Details
- o Exhibit W - Burner Oil Storage
- o Tables 5-1, 5-2, 5-3 and 5-4

Also enclosed is a response to the Bureau's information request of October 22, 1985.

Kennecott's schedule of construction calls for site grading to begin at the grinding plant location in January, 1986. Excavation for foundation construction is scheduled for March, 1986. This tight schedule is necessary to meet a September, 1988, start-up date for the modernized facilities. We appreciate your prompt attention for these changes. Mr. Al Trbovich (322-8371) is available to your staff to expedite the resolution of any questions or concerns the Bureau may have.

Very truly yours,



R. A. Malone

/mf
Enclosures

cc: L. K. Jacobsen, w/encl.
S. D. Taylor, w/encl.
A. M. Trbovich, w/encl. ✓
C. K. Vance, w/o encl.

UTAH COPPER DIVISION MODERNIZATION PROJECT
RESPONSE TO INFORMATION REQUEST
FROM THE UTAH BUREAU OF WATER POLLUTION CONTROL
OCTOBER 22, 1985

A. Sewage Treatment Plant Design

The decision to construct a grinding plant at Copperton instead of a complete concentrator has eliminated the need for a sewage treatment plant. Instead, a septic tank drain field system to treat sewage will be installed. This system will handle less than 5,000 gallons per day. Design approval will be obtained from the appropriate Salt Lake County authorities prior to initiation of construction.

- 1.Q. The numbers on sewage treatment design appearing on Page 20 and in Table 5-7 on Page 26 should be revised to match the updated design dated September 10, 1986.

- A. The sewage treatment plant has been deleted from the scope of the project. A septic tank drain field system will be installed.

- 2.Q. The specification on the bottom liner for the storm runoff retention structures, liner thickness specification and laboratory tests results on liner material are required and the source of such material should be identified.

- A. Local material will be used for pond lining. The borings and test pits in the ponds showed the surface materials to be clays and clayey gravel with some silt and silty gravel. Samples from these surface materials (clay and clayey gravel) were obtained from the test pits in the ponds. These samples were compacted to 95% of ASTM D 698 and tested for permeability. The laboratory permeability was in the range of 10^{-7} to 10^{-8} cm/sec as shown in Attachment A.

For design of the ponds, it is conservatively assumed that when compacted in the field, the permeability of the surface materials will be 10^{-6} cm/sec (2×10^{-6} ft/min).

Based on this permeability for the top 1 foot, the seepage under the maximum runoff is estimated to be:

<u>Pond</u>	<u>Seepage (gpm)</u>
I	4
II	3
III	19

It is concluded that the low projected seepage rates will provide acceptable pond retention.

To achieve a field permeability of 10^{-6} cm/sec for the top 1 foot in the ponds, the specification will include:

- a) The area of the ponds shall be stripped of all vegetation. The natural top soil shall be left in place.
- b) The stripped surface shall be scarified to a depth of 12 inches, moisture conditioned to optimum moisture content $\pm 2\%$ and compacted such that the dry density of the top 12 inches is at least 95% of the maximum by ASTM D 698.
- c) The dry density of the top 12 inches after compaction shall be verified by in-place density tests according to ASTM D 1556.

One proof test will be performed within the compacted top foot in each pond using double-ring infiltrometers (ASTM D 3885) to verify the field permeability. If the required permeability is not met, further compaction or additional material will be used.

3.Q. The fresh/potable pipeline and proximity of culinary water wells to the concentrator site used to be reviewed by the Bureau of Public Water Supplies.

A. The Project Overview and Water Management Plan (Revision 1) was submitted for review to the Bureau of Public Water Supplies on July 31, 1985.

4.Q. Design detail of fuel storage containment and moly plant settling pond showing liners to be used must be provided.

A. Detail of the burner oil storage containment is shown in the enclosed Exhibit W. The containment will be constructed of concrete. Burner oil will be used as a reagent, not as a fuel. A moly plant settling pond will not be constructed.

5.Q. List the reagents and concentrations in tailings water and potential toxicity.

A. Only two reagents will be added to the ore slurry at the grinding plant. The two are listed below.

<u>REAGENT</u>	<u>CONSUMPTION LB/DAY</u>	<u>CONCENTRATION IN FLOTATION FEED (PIPELINE)</u>
Calcium Hydroxide (lime)	154,000 (as CaO)	0.0025 + 0.025 gms/l (as CaO)
Burner Oil (Fuel Oil #1)	1,155	3.0 mg/l

All other reagents will be added at the existing flotation facilities at Magna and Arthur. This operation will not be changed.

6.Q. The granular material specification for leak detection system and collection sump detail of the water supply pond should be provided.

A. These details have been added to Exhibit U, enclosed.

7.Q. Specifications should be provided for riprap on water supply pond inlet to prevent wear on pond liner.

A. This detail has been added to Exhibit U, enclosed.

8.Q. Map and detail of process water leak collection system must be provided.

A. This information has been added to Exhibit U, enclosed.

9.Q. Provision must be made for ground water monitoring east of the concentrator site.

A. A monitoring well will be constructed to the first aquifer and will be located approximately 200 yards to 400 yards east of the septic tank drain field. The well will be constructed to the same general specification as the wells currently being installed as part of the UCD Mine Hydrogeologic Study. The well will be sampled quarterly.

1.Q. A cover should be included on drop box Type 1.

A. A cover (safety screen) has been added (Exhibit V, enclosed).

SERGENT, HAUSKINS & BECKWITH
CONSULTING GEOTECHNICAL ENGINEERS

REPORT ON LABORATORY TESTS

DATE: 09-16-1985

PROJECT: PHASE III GEOTECHNICAL INVESTIGATION

JOB NO. E84-2011

SAMPLE: T-2 AT 5.5'-6.5' REMOLDED MAX 117.3 AT 11.1 LAB. NO. 509
SHEET 1

PERMEABILITY TEST

W.O. C

WEIGHT OF WET SOIL, GMS (BEFORE)	1715.24
WEIGHT OF WET SOIL, GMS (AFTER)	1809.91
WEIGHT OF DRY SOIL, GMS	1543.90
HEIGHT OF SAMPLE, CMS	10.66
DIAMETER OF SAMPLE, (AVERAGE) CMS	10.14
WATER CONTENT, % (before and after)	11.10
SOIL DENSITY, PCF	111.97
AREA OF SAMPLE, SQ CM	80.75

HEAD inches (psig) total, in.	Q cc	TIME sec.	K cm/sec	K ft/yr
24.25	31.40	600,120	0.11E-06	0.12E+00
24.25				
23.84 (5) 162.44	48.40	451,380	0.34E-07	0.36E-01
24.78 (10) 301.98	51.10	167,220	0.53E-07	0.54E-01
23.88 (20) 578.27	47.10	158,940	0.27E-07	0.28E-01

SERGENT, HAUSKINS & BECKWITH
CONSULTING GEOTECHNICAL ENGINEERS

REPORT ON LABORATORY TESTS

DATE: 09-16-1985

PROJECT: PHASE III GEOTECHNICAL INVESTIGATION

JOB NO. E84-2011

SAMPLE: T-3 AT 1'-2' REMOLDED MAX 115.2 AT 12.5

LAB NO. 511
SHEET 1

PERMEABILITY TEST

W.O. C

WEIGHT OF WET SOIL, GMS (BEFORE)	1705.76
WEIGHT OF WET SOIL, GMS (AFTER)	1763.70
WEIGHT OF DRY SOIL, GMS	1516.32
HEIGHT OF SAMPLE, CMS	10.66
DIAMETER OF SAMPLE, (AVERAGE) CMS	10.14
WATER CONTENT, % (before and after)	12.50 17.60
SOIL DENSITY, PCF	109.97
AREA OF SAMPLE, SQ. CM	80.75

HEAD inches (psig) total, in.	Q cc	TIME sec.	K cm/sec	K ft/yr
24.16	35.40	607,380	0.13E-06	0.13E+00
24.16				
23.81 (5) 162.41	49.80	451,500	0.35E-07	0.37E-01
23.69 (10) 300.89	55.00	167,040	0.57E-07	0.59E-01
23.28 (20) 577.68	72.00	159,120	0.41E-07	0.42E-01

SERGEANT, HAUSKING & BECKWITH
CONSULTING GEOTECHNICAL ENGINEERS

REPORT ON LABORATORY TESTS

DATE: 09-13-1985

PROJECT: PHASE III GEOTECHNICAL INVESTIGATION

JOB NO. 1384-2011

SAMPLE: T-7 AT 8'-11" REMOLDED

LAB NO. 518

SHEET 1

PERMEABILITY TEST

W.O. C

WEIGHT OF WET SOIL, GMS (BEFORE)	1734.59
WEIGHT OF WET SOIL, GMS (AFTER)	1811.70
WEIGHT OF DRY SOIL, GMS	1576.90
HEIGHT OF SAMPLE, CMS	19.16
DIAMETER OF SAMPLE, (AVERAGE) CMS	10.15
WATER CONTENT, % (before and after)	10.00 14.90
SOIL DENSITY, PCF	119.75
AREA OF SAMPLE, SQ CM	89.91

HEAD inches (psig) total, in.	Q cc	TIME sec.	K cm/sec	K ft/yr
23.16	77.30	612,640	0.27E-06	0.28E+00
23.16				
72.84 (5) 1.61.44	90.30	451,140	0.61E-07	0.53E-01
23.72 (10) 300.92	44.00	167,400	0.43E-07	0.45E-01
18.81 (20) 573.21	236.00	151,680	0.13E-06	0.14E+00

UCD CONCENTRATOR MODERNIZATION PROJECT

JOB NO. 17594

SCOPE SUMMARY

The new Copperton grinding facility will be designed to process a nominal 77,000 dry st/d of ore, to produce a 30 percent solids flotation feed slurry which will be transported by gravity pipeline to the existing Magna and Arthur concentrator flotation circuits.

The Project includes the following facilities:

- o Coarse ore stockpile "A frame" structure supporting the ore feed and stockpile shuttle conveyors. The total stockpile capacity will be 348,000 st.
- o Coarse ore reclaim system. Three tunnels each with four apron feeders, and three 54 in. conveyors will feed ore to three grinding lines. The coarse ore stockpile live capacity will be 45,000 st.
- o Grinding. The facility will include three lines of grinding equipment. Each line will include a semi-autogenous mill, two ball mills, cyclones, screens, sumps, pumps and other related material handling equipment. The grinding process equipment will be housed in a grinding building with overhead cranes. The building will contain electrical and control rooms, computer room, instrument and electrical repair rooms and offices, lunch room, sanitary facilities, and sample preparation area.
- o Slurry (flotation feed) pipeline system. Gravity 48 in. slurry pipeline to splitter box near Magna, feeding a 42 in. Magna branch and a 36 in. Arthur branch.

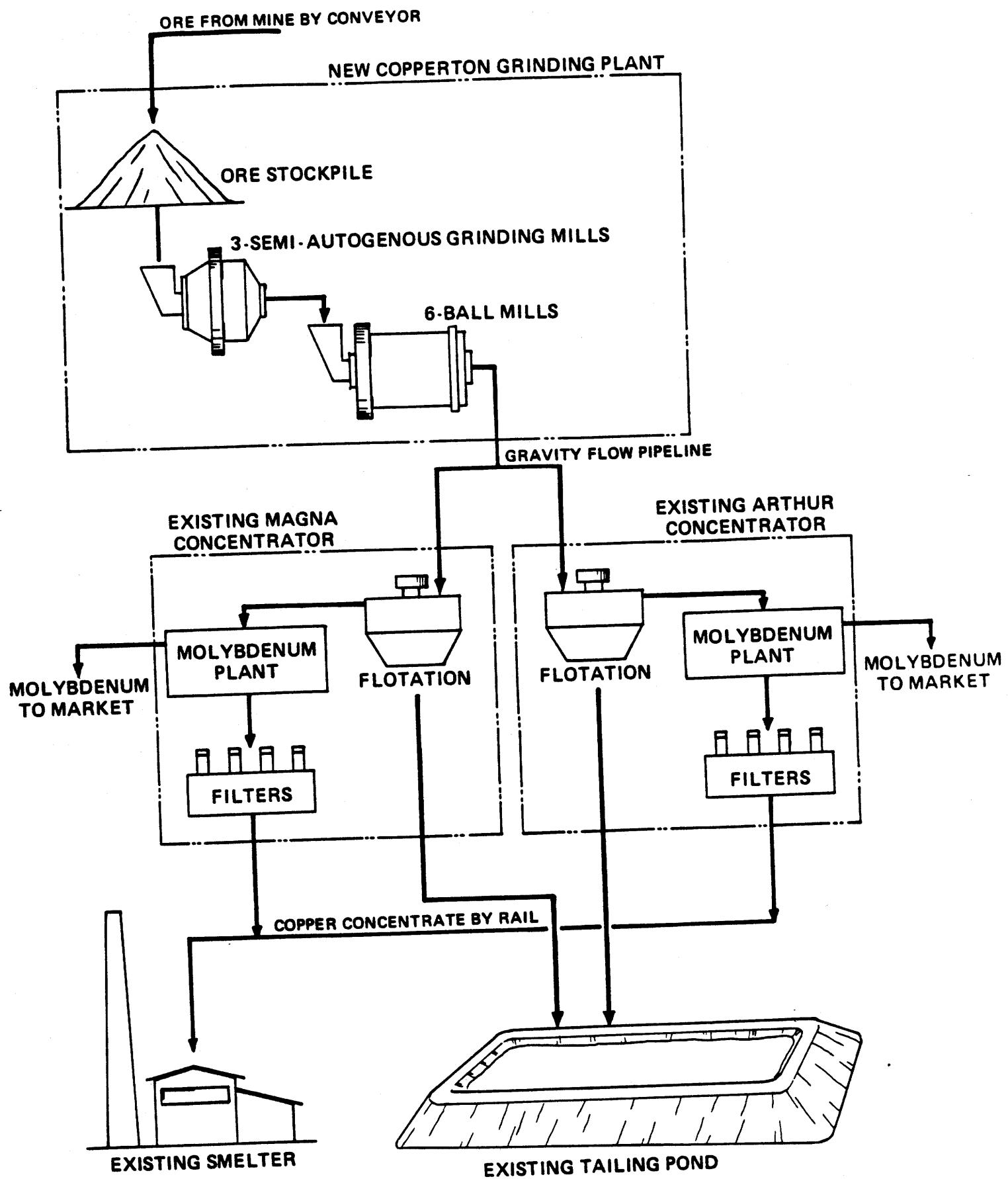
Approximate lengths - Copperton to Splitter - 48 in. - 68,000 ft
Splitter to Magna - 42 in. - 2,200 ft
Splitter to Arthur tie - 36 in. - 3,000 ft

System includes pipe bridges across Barney's Wash and railroad tracks and approximately 32 drop boxes.

- o Process Water Pipeline System. Pumping and pipeline system from Magna reservoir to a new Copperton reservoir, consisting of pump Station 3A near Magna, Booster Pump Station 3B and a 62,000 ft long, 48 in. pipeline. Each pump station will have seven 6,400 gpm pumps (six operation + one spare), an electrical substation, and a feeder from the existing Kennecott 44 kv transmission lines.

- o Common pipeline corridor for the slurry (flotation feed) and process water pipelines. The corridor width will vary from 25 to 45 ft and be 65,000 ft long.
- o Fresh water pipeline system. Pump station and 16,000 ft of 16 in. pipeline from the Salt Lake County Water Conservancy tank on Road South 10,200 ft to the new Copperton grinding facility. The pump station will have 3 - 1,500 gpm pumps (two operating + one spare), and an electrical substation and tie to an existing nearby UP&L overhead 44kv transmission line.
- o Lime Plant. Plant will include two lime silos, a milk of lime slurry preparation plant and two slurry holding tanks. A burner oil reagent storage tank and distribution system will be included next to the lime plant facility.
- o Change and Guard House. The change house will contain lockers, showers and toilets for the work force. It will be a single story facility.
- o Miscellaneous.
 - Equipment garage, eight bay, steel frame building, 7,200 sf.
 - Oxygen - acetylene bldg., 800 sf steel frame building with loading dock on one side.
 - Truck Scale - 75 ton capacity.
- o Site development and utilities for new Copperton site. Includes grading, drainage, three retention ponds, a 7.5 million gallon process water reservoir, fresh water tank; and process and utilities piping. Space will be provided for future addition of flotation, molybdenum plant and tailings thickeners.
- o Yard Electrical - 13.8kv plant substation (adjacent to UP&L 138kv substation); plant feeders, yard lighting, grounding yard distribution, ductbanks, and telemetering to offsite facilities.
- o Plant Roads A 1.7 mile main access road, plus in-plant roads and parking.

MODERNIZED UCD FLOW DIAGRAM



UCD CONCENTRATOR MODERNIZATION PROJECT
JOB 17594

"OUTLINE"
SUMMARIZED SCOPE CHANGES TO MODERNIZED FACILITY

1. Delete flotation at the new Copperton facility, utilize planned 48 in. tailings pipeline to transport slurry (flotation feed) to the existing Arthur and Magna concentrator flotation circuits, and delete tailings line downstream from the Arthur/Magna junction point.
2. Delete molybdenum sulfide separation plant.
3. Delete tailings thickeners.
4. Delete copper concentrate pipeline. Utilize existing rail shipment facilities from Arthur and Magna.
5. Delete tailings disposal to tailings pond. Use existing facilities at Arthur and Magna.
6. Increase the capacity of the process water system from 36 in. to 48 in. to return a larger volume of water to the new Copperton grinding facility. The process water reservoir capacity will be increased from 5.6 to 7.5 million gallons.
7. Delete the following ancillary facilities at the new Copperton facility:

Office
Laboratory
Maintenance Shop

Existing facilities will be utilized. The estimated plant work force will be reduced from 244 to 96.

8. Delete retention pond IV, which will no longer be required because tailings thickeners have been deleted. Pond III will be sized to retain one hour of flotation feed pipeline flow in addition to the 10 year, 24 hour storm runoff volume.

TABLE 5-1

Estimate of peak runoff for zones at plant site before development

Zones	Area* (Acres)	Time of Concent.	Runoff Coef.	Rainfall Intensity (In/hr)			Runoff Flow Rate (cfs)		
				TC	C	110	150	1100	Q ₁₀
I	26.1	15**	0.3		2.2	3.1	3.5	1.7	24
II	12.8	15	0.3		2.2	3.1	3.5	8	12
III	73.4	15	0.3		2.2	3.1	3.5	48	68

* Excludes 5.0 acres for the 7,500,000 gallon process water reservoir
 ** 15 minutes assumed as minimum

TABLE 5-2

Factors for zones at plant site after development

Zones	Total Area(acres)	Developed	Undevel	Runoff Coefficient			24hr Rain Fall (inches)		
				CD	CU	Design C	10yr	50yr	100yr
I	26.1	13.8	12.3	0.80	0.3	0.56	2.6	3.4	3.8
II	12.8	11.7	1.1	0.85	0.3	0.80	2.6	3.4	3.8
III	73.4	36.3	37.1	0.80	0.3	0.55	2.6	3.4	3.8

TABLE 5-3

Estimate of peak runoff for zones at plant site after development

Zones	Area (acre)	Time of Concent.	Runoff coef.	Rainfall Intensity (In/hr)			Runoff Q10	Runoff Q50	Runoff Q100
				Tc	Min	C			
I	26.1	15	0.56	2.2	3.1	3.5	32	45	51
II	12.8	15	0.80	2.2	3.1	3.5	23	32	36
III	73.4	15	0.55	2.2	3.1	3.5	89	125	141

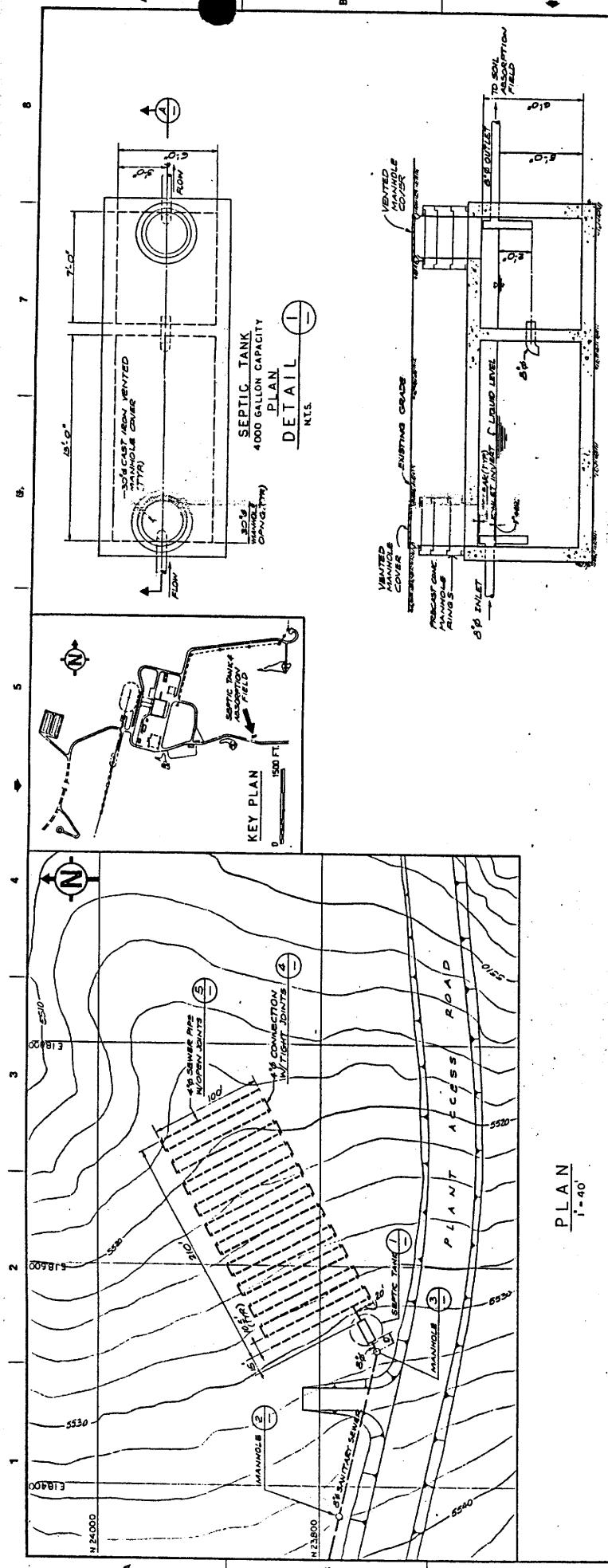
TABLE 5-4

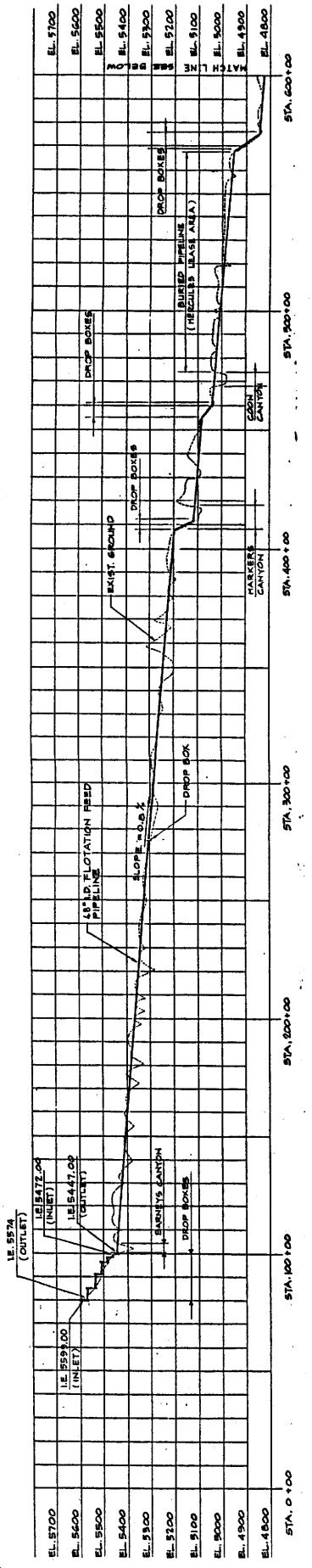
Estimate of excess discharge for events that exceed retention basin design of maximum measured duration storm with comparison to the undeveloped condition.

Zones	Retention Basin Vol**	Undeveloped 24-hr runoff (Acre-ft)			Developed 24-hr runoff (Acre-ft)			Runoff in excess of Retention Basin (Acre-ft)		
		10 yr	50 yr	100 yr	10 yr	50 yr	100 yr	50 yr	100 yr	100 yr
I	3.2	1.7	2.2	2.5	3.2	4.1	4.6	0.9	1.4	1.4
II	2.2	0.8	1.1	1.2	2.2	2.9	3.2	0.7	1.0	1.0
III	8.7	4.8	6.2	7.0	8.7	11.4	12.8	2.7	4.1	4.1

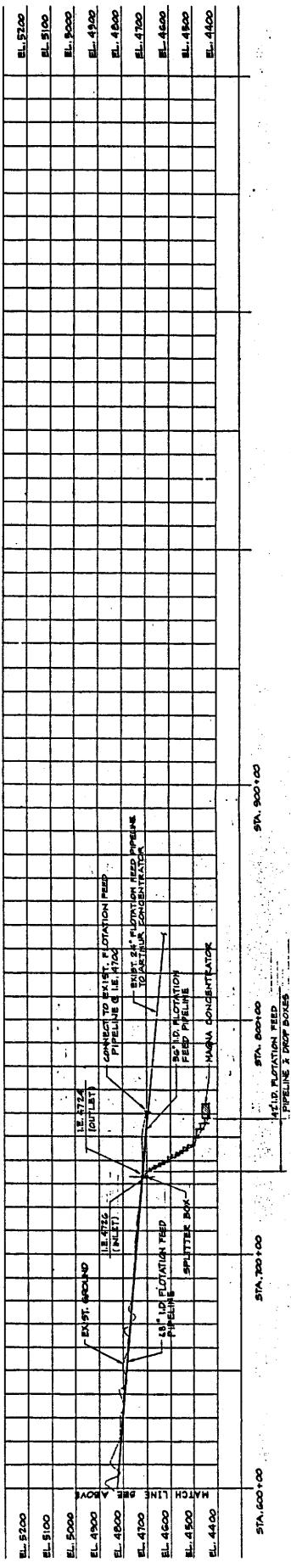
* Excludes sedimentation allowance of 10 percent.

** Excluded 7.0 Acre-ft for emergency slurry (flootation feed) retention.



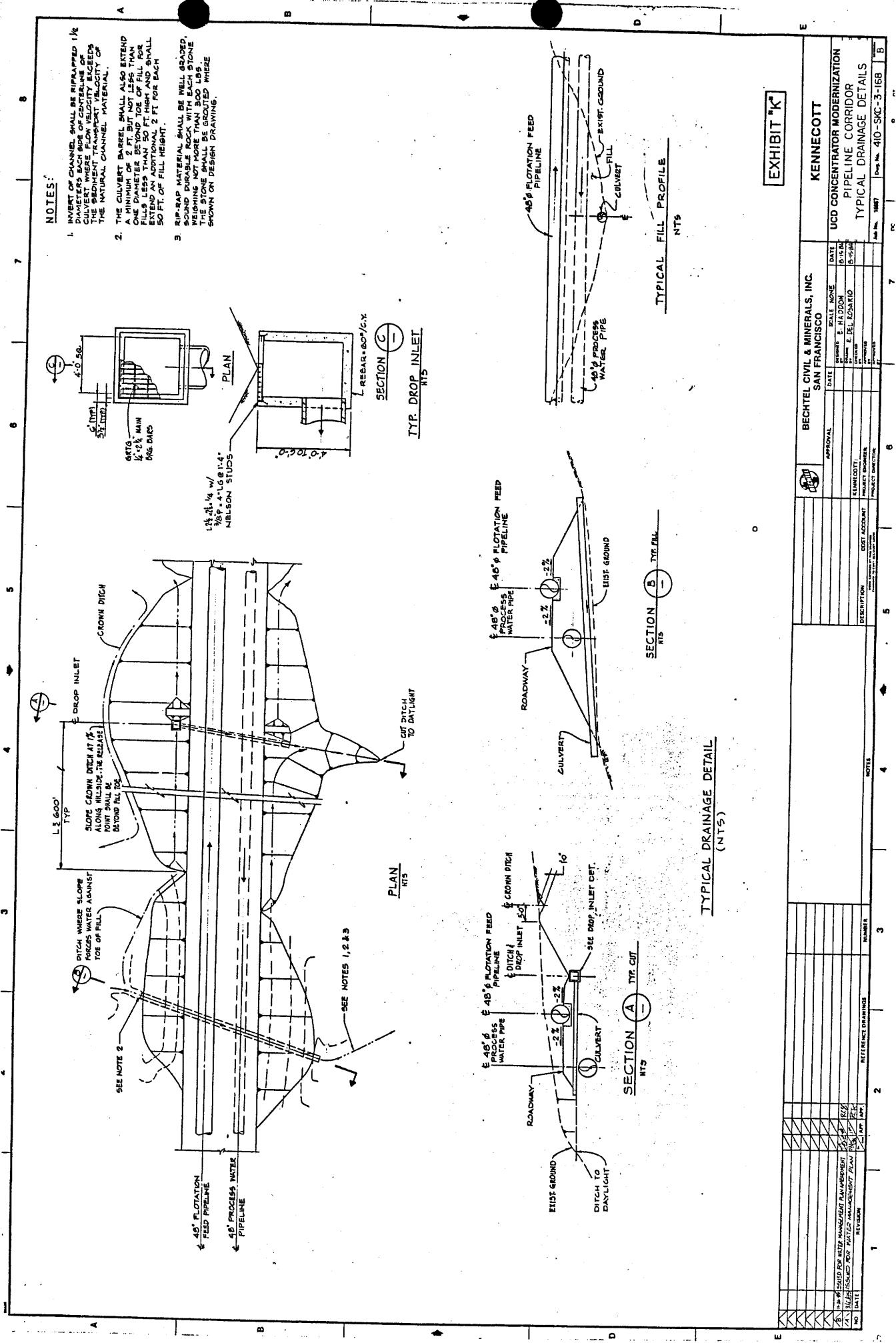


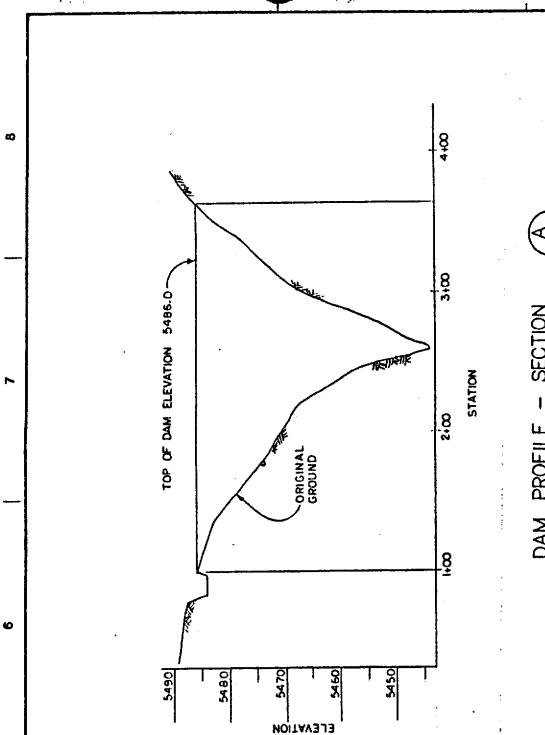
PROFILE



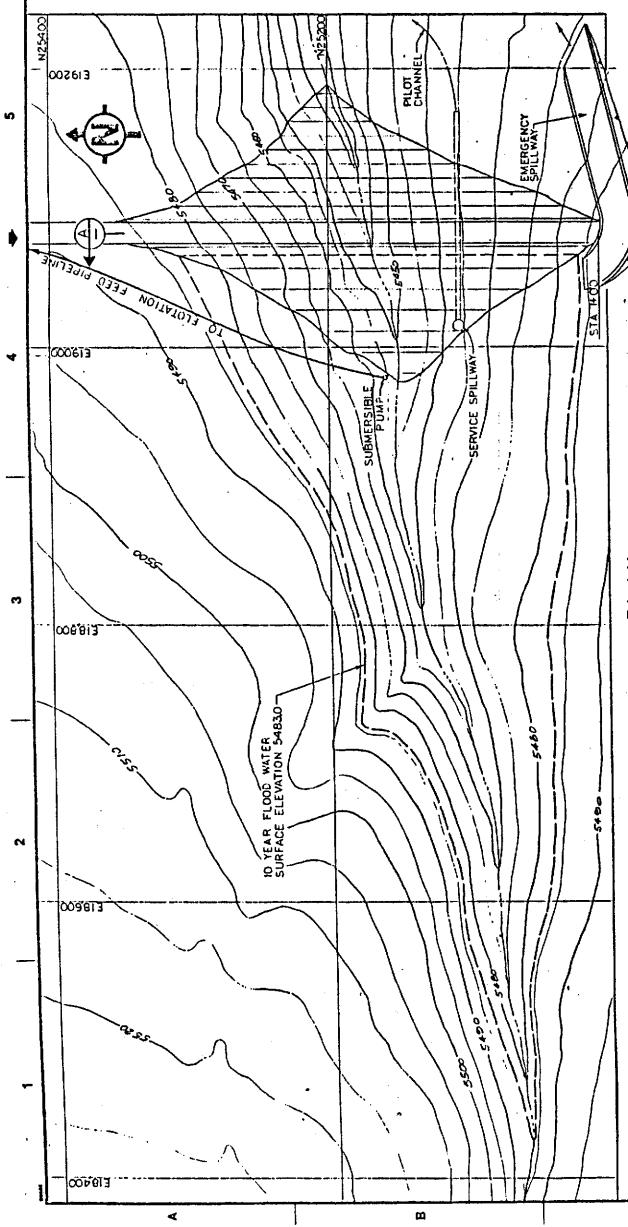
PROFILE
HOR 10/2000

EXHIBIT "H"

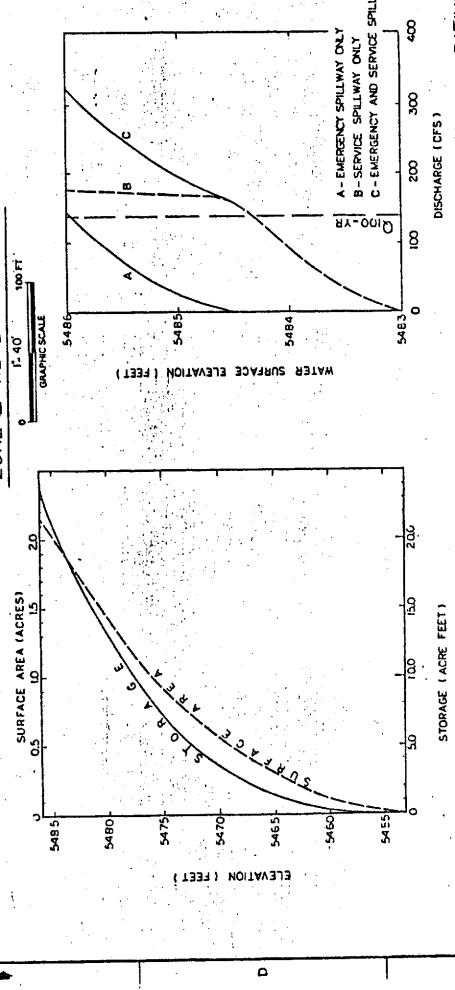




DAM PROFILE - SECTION A-A



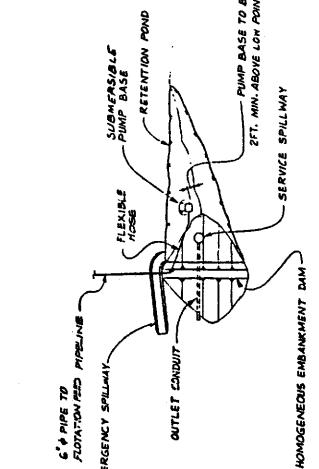
ZONE III RETENTION POND



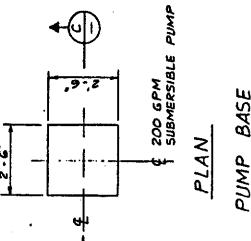
AREA - CAPACITY CURVE

KENNECOTT	
BECHTEL CIVIL & MINERALS, INC.	SAN FRANCISCO
APPROVAL	SCALE AS NOTED DATE
REVIEWED:	FOR WORK
BY:	CLASS
R. MACDONALD, D. COOK	OWNER
DATE:	PERIOD
KENNECOTT	PRODUCT ENGINEERS
COST ACCOUNT	ITEM NO. 712-SC-3-161
DESCRIPTION	NOTES

EXHIBIT "P"



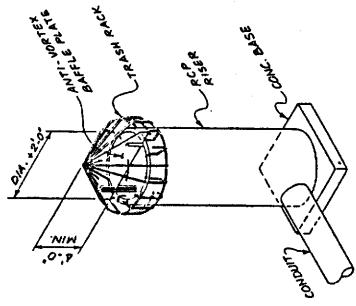
TYPICAL KEY PLAN



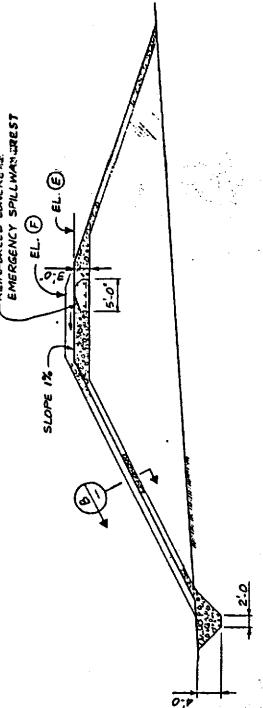
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SECTION C

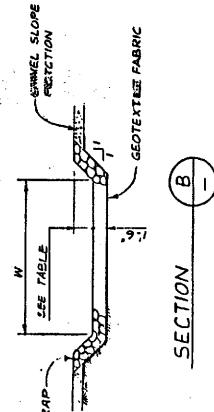
EXHIBIT "S"



SERVICE SPILLWAY INLET TOWER

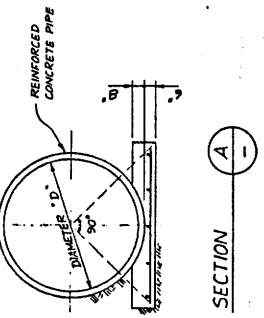


EMERGENCY SPILLWAY - TYPICAL FILE



SECTION

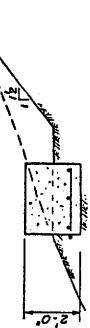
SERVICE SPILLWAY AND OUTLET CONDUIT - TYPICAL PROFILE



SERVICE SPILLWAYS

EMERGENCY SPILLWAYS

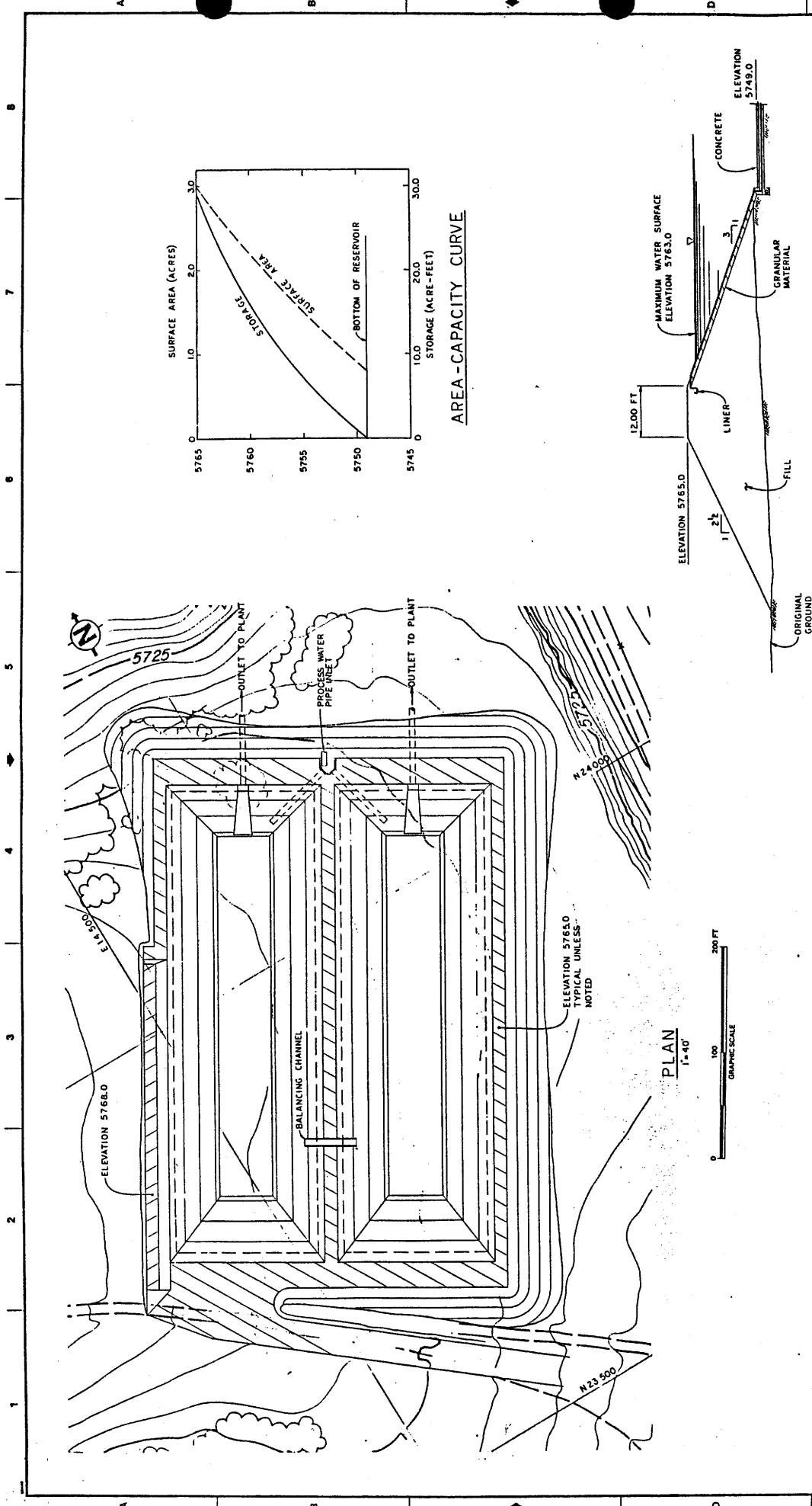
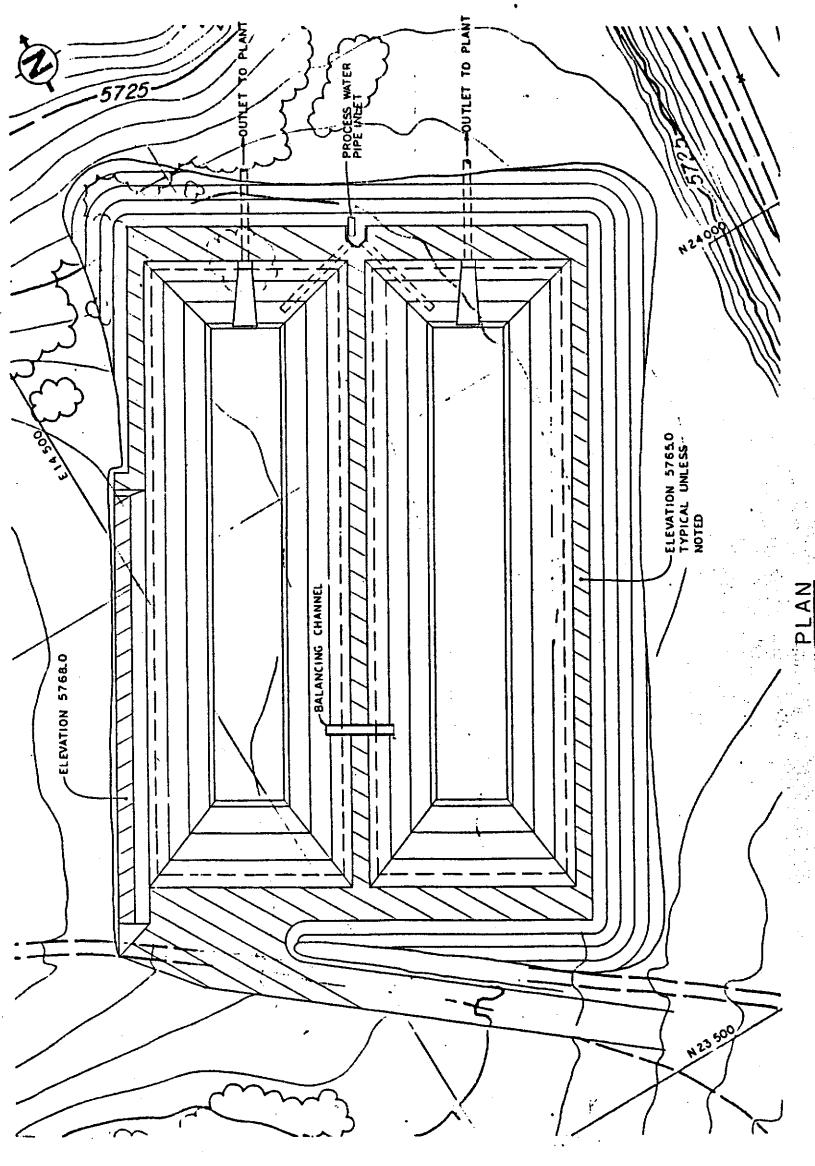
REACH	ZONE	CHANNEL EL. (ft.)	WIDTH (ft.)	LENGHT (ft.)	DAM CREST EL. (ft.)
I		5567.0	12	50	5569.0
II		5540.0	12	120	5542.0
III		5484.0	22	135	5486.0



1

UCD CONC
RETENTION

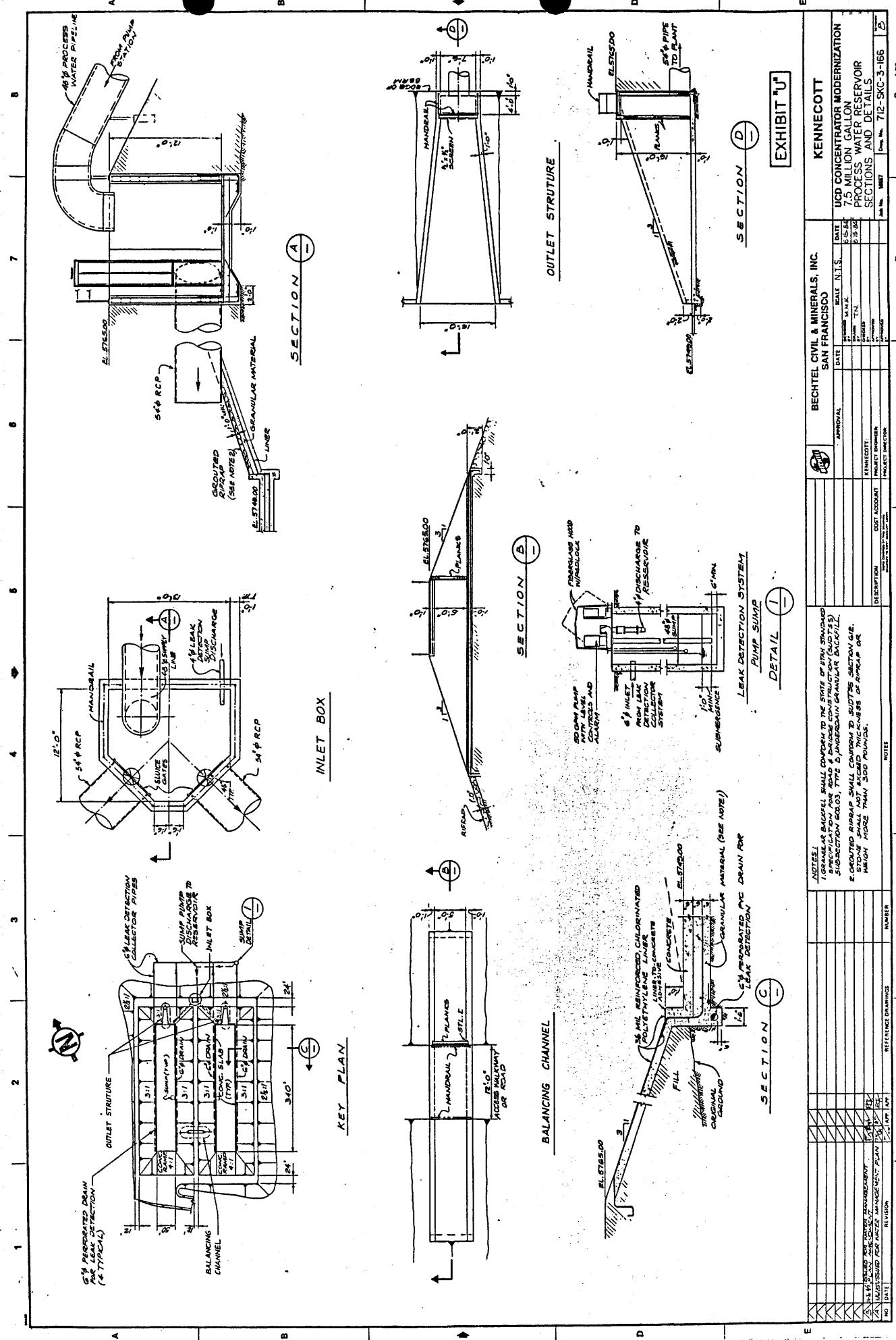
KENNECOTT
UCD CONCENTRATOR MODERNIZATION
RETENTION POND DAMS
TYPICAL SECTIONS AND DETAILS

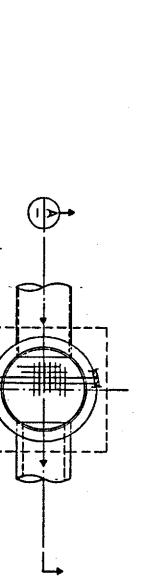


TYPICAL SECTION THROUGH RESERVOIR

EXHIBIT "T"

GRAPHIC SCALE		KENNECOTT		BECHTEL CIVIL & MINERALS, INC.		SAN FRANCISCO		UCB CONCENTRATOR MODERNIZATION	
				APPROVAL		DATE		7.5 MILLION GALLON PROCESS WATER RESERVOIR	
				SALES IS NOTED		SALES IN KONTAKA INDIA		SALES IN T. H. E. M. A. Y.	
				DATE		DATE		DATE	
1. AN EMERGENCY SPILLWAY WILL BE PROVIDED TO PREVENT OVERFLOWING OR DIKE IN THE EVENT OF FAILURE OF LEVEL CONTROLS AND OPERATOR FAILURE TO RESPOND TO HIGH RESERVOIR LEVEL.				1-14-82		1-14-82		1-14-82	
				PROJECT NUMBER:		PROJECT NUMBER:		PROJECT NUMBER:	
				PROJECT DIRECTOR:		PROJECT DIRECTOR:		PROJECT DIRECTOR:	
				COST ACCOUNT:		COST ACCOUNT:		COST ACCOUNT:	
				REFERENCE DRAWINGS:		REFERENCE DRAWINGS:		REFERENCE DRAWINGS:	
				NUMBER:		NUMBER:		NUMBER:	
				REF. DATE:		REF. DATE:		REF. DATE:	
				REVISION:		REVISION:		REVISION:	
				NOTES:		NOTES:		NOTES:	





PLAN

RUBBER LINED STEEL PIPE & COFFLE LUGS
STEELING ADAPTER

VACUUM COUPLING

CONCRETE PIPE

CONCRETE SECTION

GROUT TO BASE

SECTION

A

SECTION

B

SECTION

C

SECTION

D

SECTION

E

SECTION

F

SECTION

G

SECTION

H

SECTION

I

SECTION

J

SECTION

K

SECTION

L

SECTION

M

SECTION

N

SECTION

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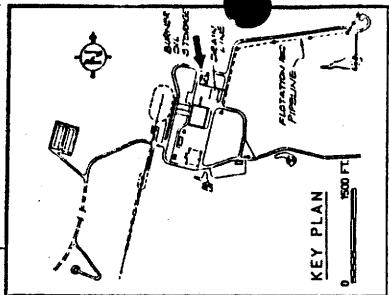
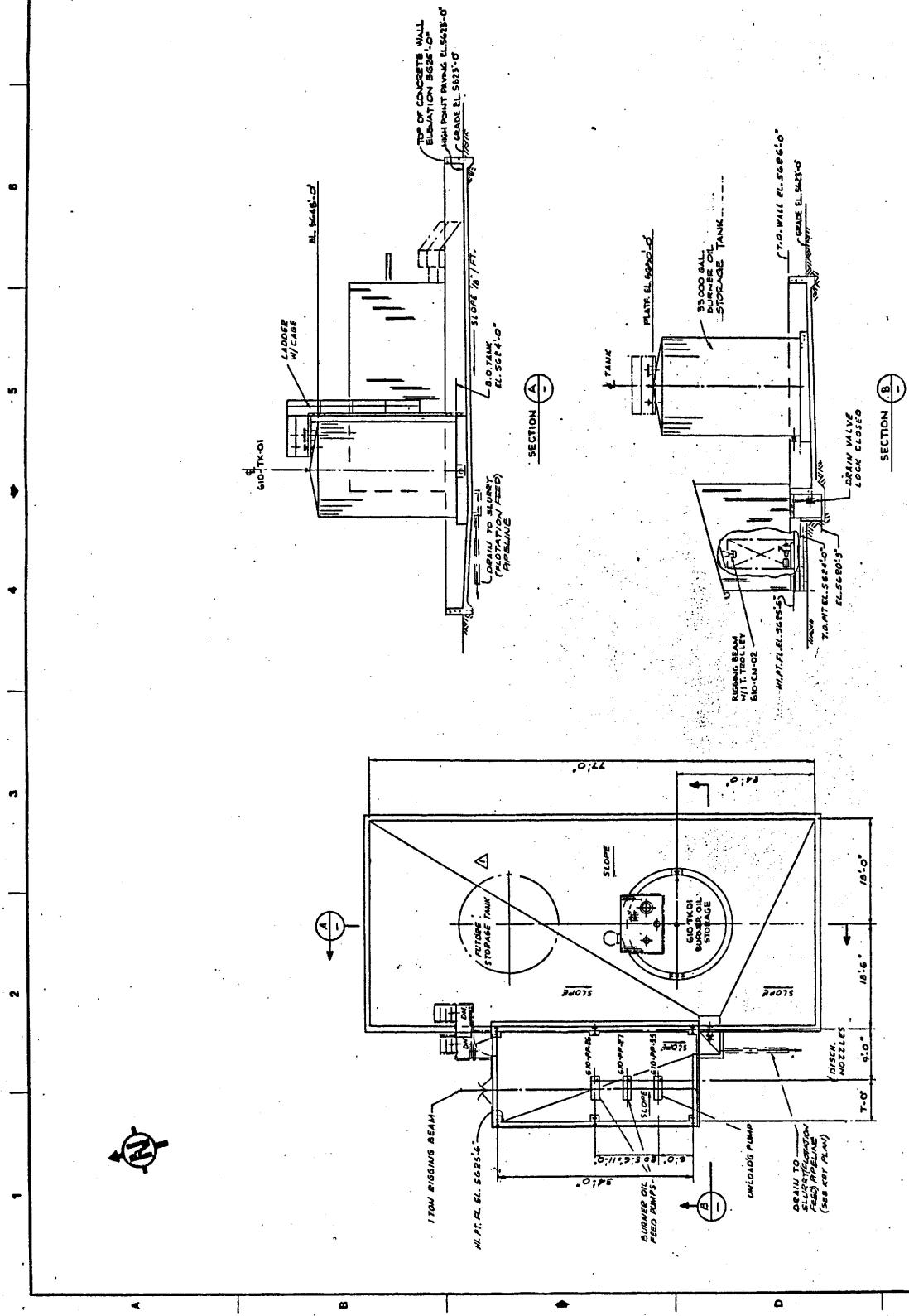
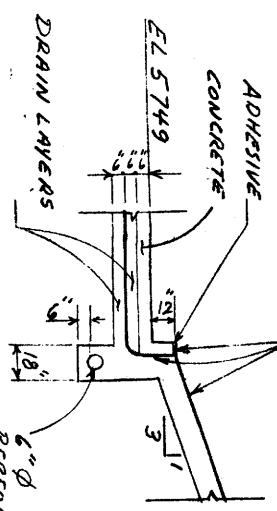


EXHIBIT "W"



36 MIL. REINFORCED
CHLORINATED POLYETHYLENE LINER

ADHESIVE
CONCRETE



DETAIL ①
 $1'' = 5'$

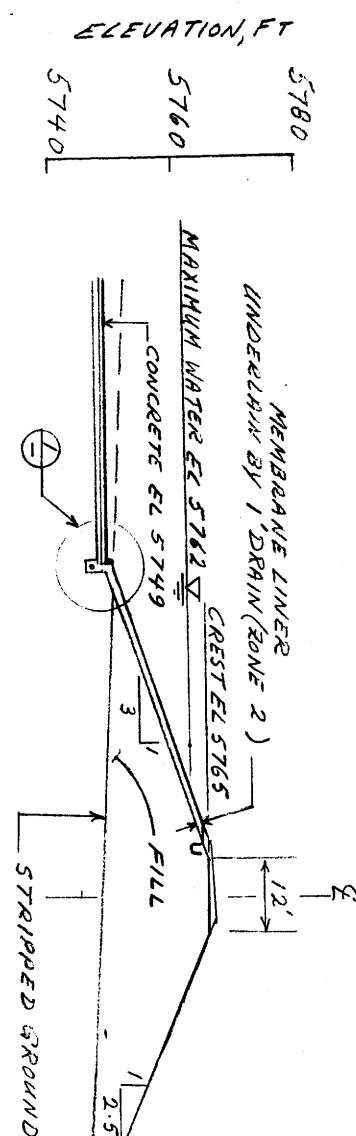


EXHIBIT X

PROCESS WATER RESERVOIR
LINER DETAIL

SECTION A
 $1'' = 20'$

NOTE: THE PERMEABILITY OF MATERIAL
UNDERLYING THE MEMBRANE LINER
AND DRAIN LAYER IN CUT AREAS
IS IN THE RANGE OF 10^{-3} TO 10^{-2} CM/SEC